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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/070,516	03/04/2002	Hideo Yoshida	F-7336	6823

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EXAMINER	
KOPPIKAR, VIVEK D	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/070,516	YOSHIDA ET AL.	
	Examiner	Art Unit	
	Vivek D Koppikar	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 March 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27,30-38 and 41* is/are rejected.

7)☒ Claim(s) *28,29,39 and 40* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/4/02* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1, 4, 8-12, 18-21, 23, 27, 30-32, 36, 38 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Publication Number 10-321991 (hereafter referred to as JP'991).

With regard to Claims 1 and 21, JP'991 teaches a method and apparatus of electrochemical treatment which takes place in a super-critical state in a reaction vessel (30) which contains an electrolytic solution (11) (Translated Abstract and Figure 1).

With regard to Claim 4, the supercritical fluid used as a solvent is shifted to its critical point after the electrochemical reaction (Translated Detailed Description, Section [0008]).

With regard to Claims 8, 12, 18, 27, 32 and 36, in JP'991 an electrolysis process takes place in the reaction vessel (30) with the aide of an electrode (51) and this process takes place at a supercritical pressure (Translated Abstract, Translated Claim 1 and Figure 1).

With regard to Claim 9 and 19, the solvent (matter) in JP'991 which is shifted into a super-critical state is carbon dioxide (Translated Claim 5).

With regard to Claims 10 and 20, the electrochemical process in JP'991 is electroplating (Translated Claim 1).

With regard to Claims 11 and 31, JP'991 teaches a method of electrochemical reaction which takes place in a reaction vessel (30) which contains an electrolytic solution (11). The reaction vessel (30) also contains an electrode (51). The electrochemical reaction is executed in at a critical pressure (pressurized state) (Translated Abstract and Translated Detailed Description, Section [0008]).

With regard to Claims 23, after the electrochemical process has taken place in JP'991 the supercritical fluid is still in a supercritical state (Translated Detailed Description, Section [0008]).

With regard to Claim 30 and 41, after the electrochemical treatment process has taken place in JP'991 a multilayered circuit board is formed (Translated Detailed Description, Section [0014]).

With regard to Claim 38, the electrochemical treatment process as well as the pretreatment and post treatment process take place in one reaction vessel (30) in JP'991 (Figure 1).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'991 as applied to Claims 1 and 11 above respectively, and in further view of Japanese Publication Number 2000-254405 (hereafter referred to as JP'405).

In JP'991 an emulsifying agent is not introduced into the reaction vessel.

JP'405 teaches a surfactant (emulsifying agent) that is used in a carbon dioxide medium and introducing this agent causes polar substances (electrolytes) to solubilize. Therefore at the time of the invention one of ordinary skill in the art would have been motivated to introduce an emulsifying agent as taught in JP'405 into the reaction vessel (30) of JP'991 with the expectation of increasing the solubility of the carbon dioxide into the electrolytic solution (11) of JP'991.

5. Claims 5-7, 15-17, 24-26, 33 and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable JP'991 as applied to Claims 1, 12, 21, and 31 above, respectively, and in further view of Japanese Publication Number 09-139374 (hereafter referred to as JP'374).

JP'991 does not teach the step of introducing pressurized fluid to clean or dry the electrode. JP'991 also does not teach a reservoir which is placed outside of the vessel which is used to dispose of the supercritical fluid once it has been used. Finally, JP'991 does not teach a method of refluxing the supercritical fluid to the reaction vessel.

JP'374 teaches a surface treatment method and apparatus which uses supercritical fluid to clean and dry an electrode. The spent supercritical fluid is also moved to a reservoir (25) and refluxed back into the reaction vessel once it has been used (Translated Abstract and Figure). Using this recycle and reflux arrangement reduces the waste generated. At the time of the invention one of ordinary skill in the art would have been motivated to use a recycle and reflux stream to clean the electrode of JP'991 with the expectation of reducing the liquid waste generated as recited in JP'374.

6. Claims 3, 14, 22 and 34 are rejected under 35 U.S.C 103(a) as being unpatentable over JP'991 as applied to Claims 1, 12, 21, and 31 above, respectively, and in further view of Japanese Patent Number 11-92990 (hereafter referred to as JP'990).

JP'991 does not teach a process of cleaning matter or removing oxide film from the matter to be electroplated.

JP'990 teaches a pretreatment process and apparatus of a reaction chamber before an electrochemical reaction takes place. A supercritical fluid comes and cleans a matter to be electroplated and this results in substrate whose microstructures are not transformed or eroded during the electroplating process (Translated Effect of the Invention). At the time of the invention one of ordinary skill in the art would have been motivated to include this pretreatment process in JP'991 with the expectation of obtaining an electroplated article without transformed or destroyed microstructures as recited in JP'990.

7. Claims 5, 15, 24, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'991 as applied to Claims 1, 12, 21, and 31 above, respectively, and in further view of Japanese Patent Number 2-209729 (hereafter referred to as JP'729).

JP'991 does not teach a post treatment process wherein the supercritical matter is used to clean or dry the electrode after the electrochemical process.

JP'729 teaches a supercritical electroplating process and apparatus followed by a post treatment process which also uses a supercritical fluid (carbon dioxide) to remove foreign substances from the substrate and this results in a substrate or circuit board with improved reliability (Translated Abstract). At the time of the invention one of ordinary skill in the art would have modified the process of JP'991 to include a post treatment process as taught in

JP'729 with the expectation of providing a circuit board with no foreign matter on its surface and higher reliability.

Allowable Subject Matter

8. Claims 28-29 and 39-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With regard to Claims 28 and 39, the prior art of record does not teach or suggest a sequential pretreatment and post treatment process all of which take place at supercritical conditions.

With regard to Claims 29 and 40, the prior art of record does not teach a process wherein the electrochemical reaction equipment is moved on the side of the succeeding treatment process.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Vivek Koppikar** whose telephone number is **(703) 305-6618**. The examiner can normally be reached on Monday-Friday from 8 AM to 5 PM, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones, can be reached at (703) 308-3822. The fax phone numbers for the organization where this application or proceeding are assigned are (703) 305-7718 for regular communications and (703) 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Vivek Koppikar

10/22/03

DEBORAH JONES
SUPERVISORY PATENT EXAMINER